

SOIL CLASSIFICATION LEGEND

MAJOR DIVISIONS			TYPICAL NAMES		SAMPLE TYPE SYMBOLS																																																			
COARSE GRAINED SOILS More than half is larger than No. 200 sieve	GRAVELS More than half coarse fraction is larger than No. 4 sieve size	Clean gravels with little or no fines	GW	Well graded gravels, gravel-sand mixtures		Disturbed bag or jar sample																																																		
		Gravel with over 12% fines	GP	Poorly graded gravels, gravel-sand mixtures		Std. Penetration Test (2.0" OD)																																																		
			GM	Silty gravels, gravel-sand-silt mixtures		Type U Ring Sampler (3.25" OD)																																																		
			GC	Clayey gravels, gravel-sand-clay mixtures		California Sampler (3.0" OD)																																																		
	SANDS More than half coarse fraction is smaller than No. 4 sieve size	Clean sands with little or no fines	SW	Well graded sands, gravelly sands		Undisturbed Tube Sample																																																		
		Sands with over 12% fines	SP	Poorly graded sands, gravelly sands		Grab Sample																																																		
			SM	Silty sand, sand-silt mixtures		Core Run																																																		
			SC	Clayey sands, sand-clay mixtures		Non-standard Penetration Test (with split spoon sampler)																																																		
			CONTACT BETWEEN UNITS ———— Change in geologic unit ——— Soil type change within geologic unit - - - - - Obscure or gradational change																																																					
								MOISTURE DESCRIPTION Dry - Free of moisture, dusty Moist - Damp but no visible free water Wet - Visible free water, saturated																																																
WELL COMPLETIONS 																																																								
					PHYSICAL PROPERTY TEST AL - Atterberg Limits FC - Fines Content GSD - Grain Size Distribution MC - Moisture Content MD - Moisture Content/Dry Density Comp - Compaction Test (Proctor) SG - Specific Gravity CBR - California Bearing Ratio RM - Resilient Modulus Perm - Permeability TXP - Triaxial Permeability Cons - Consolidation Chem - Analytical Chemical Analysis Corr - Corrosion VS - Vane Shear DS - Direct Shear UC - Unconfined Compression TX - Triaxial Compression UU - Unconsolidated, Undrained CU - Consolidated, Undrained CD - Consolidated, Drained																																																			
FINE GRAINED SOILS More than half is smaller than No. 200 sieve	SILTS AND CLAYS Liquid limit less than 50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity	DESCRIPTORS FOR SOIL STRATA AND STRUCTURE (ENGLISH/METRIC) <table><tr><td rowspan="7">General Thickness or Spacing</td><td>Parting:</td><td>less than 1/16 in. (1/6 cm)</td><td rowspan="7">Structure</td><td>Pocket:</td><td>Erratic, discontinuous deposit of limited extent</td><td rowspan="7">General Attitude</td><td>Near horizontal:</td><td>0 to 10 deg.</td></tr><tr><td>Seam:</td><td>1/16 to 1/2 in. (1/6 to 1 1/4 cm)</td><td>Lens:</td><td>Lenticular deposit</td><td>Low angle:</td><td>10 to 45 deg.</td></tr><tr><td>Layer:</td><td>1/2 to 12 in. (1 1/4 to 30 1/2 cm)</td><td>Varved:</td><td>Alternating seams of silt and clay</td><td>High angle:</td><td>45 to 80 deg.</td></tr><tr><td>Stratum:</td><td>> 12 in. (30 1/2 cm)</td><td>Laminated:</td><td>Alternating seams</td><td>Near Vertical:</td><td>80 to 90 deg.</td></tr><tr><td>Scattered:</td><td>< 1 per ft. (30 1/2 cm)</td><td>Interbedded:</td><td>Alternating layers</td><td></td><td></td></tr><tr><td>Numerous:</td><td>> 1 per ft. (30 1/2 cm)</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>		General Thickness or Spacing	Parting:	less than 1/16 in. (1/6 cm)	Structure	Pocket:	Erratic, discontinuous deposit of limited extent	General Attitude	Near horizontal:	0 to 10 deg.	Seam:	1/16 to 1/2 in. (1/6 to 1 1/4 cm)	Lens:	Lenticular deposit	Low angle:	10 to 45 deg.	Layer:	1/2 to 12 in. (1 1/4 to 30 1/2 cm)	Varved:	Alternating seams of silt and clay	High angle:	45 to 80 deg.	Stratum:	> 12 in. (30 1/2 cm)	Laminated:	Alternating seams	Near Vertical:	80 to 90 deg.	Scattered:	< 1 per ft. (30 1/2 cm)	Interbedded:	Alternating layers			Numerous:	> 1 per ft. (30 1/2 cm)															
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SILTS AND CLAYS Liquid limit greater than 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts																																																					
		CH	Inorganic clays of high plasticity, fat clays																																																					
		OH	Organic clays of medium to high plasticity, organic silts																																																					
		PT	Peat and other highly organic soils																																																					
HIGHLY ORGANIC SOILS																																																								
STRUCTURE DESCRIPTION (cont.) Fractured Breaks easily along definite fractured planes Slickensided Polished, glossy, fractured planes Blocky, Diced Breaks easily into small angular lumps Sheared Disturbed texture, mix of strengths Homogeneous Same color and appearance throughout																																																								
RELATIVE DENSITY OR CONSISTENCY VS. SPT N-VALUE <table><tr><th colspan="3">COARSE GRAINED</th><th colspan="3">FINE GRAINED</th></tr><tr><th>Density</th><th>N (blows/ft)</th><th>Approx. Relative Density (%)</th><th>Consistency</th><th>N (blows/ft)</th><th>Approx. Undrained Shear Str. (psf)</th></tr><tr><td>Very Loose</td><td>0 to 4</td><td>0 - 15</td><td>Very Soft</td><td>0 to 2</td><td><250</td></tr><tr><td>Loose</td><td>4 to 10</td><td>15 - 35</td><td>Soft</td><td>2 to 4</td><td>250 - 500</td></tr><tr><td>Medium Dense</td><td>10 to 30</td><td>35 - 65</td><td>Medium Stiff</td><td>4 to 8</td><td>500 - 1000</td></tr><tr><td>Dense</td><td>30 to 50</td><td>65 - 85</td><td>Stiff</td><td>8 to 15</td><td>1000 - 2000</td></tr><tr><td>Very Dense</td><td>Over 50</td><td>85 - 100</td><td>Very Stiff</td><td>15 to 30</td><td>2000 - 4000</td></tr><tr><td></td><td></td><td></td><td>Hard</td><td>over 30</td><td>>4000</td></tr></table>									COARSE GRAINED			FINE GRAINED			Density	N (blows/ft)	Approx. Relative Density (%)	Consistency	N (blows/ft)	Approx. Undrained Shear Str. (psf)	Very Loose	0 to 4	0 - 15	Very Soft	0 to 2	<250	Loose	4 to 10	15 - 35	Soft	2 to 4	250 - 500	Medium Dense	10 to 30	35 - 65	Medium Stiff	4 to 8	500 - 1000	Dense	30 to 50	65 - 85	Stiff	8 to 15	1000 - 2000	Very Dense	Over 50	85 - 100	Very Stiff	15 to 30	2000 - 4000				Hard	over 30	>4000
COARSE GRAINED			FINE GRAINED																																																					
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Notes: 1. Sample descriptions in this report are based on visual field and laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates, and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual classification methods in accordance with ASTM D 2488 were used as an identification guide. Where laboratory data are available, soil classifications are in general accordance with ASTM D 2487. 2. Dual symbols are used to indicate gravel and sand units with 5 to 12 percent fines. 3. WOR = weight of rod.																																																								
<div>CDM</div> <div>Universal Manufacturing Supplemental Assessment Woodinville, Washington</div> <div>Project No: 22080.74417 Figure: 1</div>																																																								

NEIS_BORING_LOG_22080-74417-UNIVERSAL_MFG.GPJ_CDM_BLLV.GDT_4/20/11_REV.

Other Tests	Sample No.	Moisture Content (%)	Dry Density (pcf)	PI (ppm) [reading/background]	Penetration Resistance (blows / 6 in.)	Depth (feet)	Sample	USCS	Symbol	Boring Log B102 DESCRIPTION	Elev. (feet)
				0-1.5		2				Gravelly SAND with SILT (SM), dark brown, fine to medium sand and gravel, subrounded, loose, moist, slight hydrocarbon-like odor (Fill). Gravel becomes angular to subrounded, fine to coarse, becomes dense at ~0.5 ft bgs (Weathered Native).	
				0-1.5		4				Becomes gray-brown at ~4.5 ft bgs.	
				0-1.5		6		SM		Cobble encountered, granitic, becomes wet at ~6 ft bgs.	
				0-1.5		8					
						10		SM		Gravelly SAND with SILT (SM), gray, fine to very fine sand, fine to medium gravel, subrounded, very dense, wet, diamictite (Till).	
						12				Boring terminated at ~12 ft bgs. Groundwater encountered at ~6 ft bgs. 3/8" bentonite chips to ~8" bgs, concrete to surface.	
						14					

Station: _____	Drill Rig: <u>Limited Access Direct Push</u>
Surface Elevation: _____	Equipment/Hammer: <u>Acetate Liner/</u>
Logged By: <u>AAL</u>	Date Completed: <u>4-2-11</u>


	Universal Manufacturing Supplemental Assessment Woodinville, Washington
	Boring Log B102 Project No: 22080.74417

Figure: 3
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NEIS_BORING_LOG_22080-74417-UNIVERSAL_MFG.GPJ_CDM_BLLV.GDT_4/20/11_REV.

Other Tests	Sample No.	Moisture Content (%)	Dry Density (pcf)	PI (ppm) [reading/background]	Penetration Resistance (blows / 6 in.)	Depth (feet)	Sample	USCS	Symbol	Boring Log B103 DESCRIPTION	Elev. (feet)
				0-1.5		2				Gravelly SAND with SILT (SM), dark gray-brown, fine to medium sand and gravel, subangular to subrounded, dense, moist (Fill). Becomes brown-yellow to gray-brown, with iron mottling, gravel becomes fine to coarse at 1 ft bgs (Weathered Native).	
				0-1.5		4		SM		Becomes wet, very dark gray seam (~2" thick) at ~4.5 ft bgs.	
				0-1.5		6				Becomes wet at ~6 ft bgs.	
				0-1.5		8				Becomes gray-brown at ~7 ft bgs.	
						10				Boring terminated at 8 ft bgs. Groundwater encountered at ~6 ft bgs. 3/8" bentonite chips to 3" bgs, asphalt cold patch to surface.	
						12					
						14					

Station: _____	Drill Rig: <u>Limited Access Direct Push</u>
Surface Elevation: _____	Equipment/Hammer: <u>Acetate Liner/</u>
Logged By: <u>AAL</u>	Date Completed: <u>4-2-11</u>


	Universal Manufacturing Supplemental Assessment Woodinville, Washington
	Boring Log B103 Project No: 22080.74417


Figure: 4
 1 of 1

NEIS_BORING_LOG_22080-74417-UNIVERSAL_MFG.GPJ_CDM_BLLV.GDT_4/20/11_REV.

Other Tests	Sample No.	Moisture Content (%)	Dry Density (pcf)	PID (ppm) [reading/background]	Penetration Resistance (blows / 6 in.)	Depth (feet)	Sample	USCS	Symbol	Boring Log B104 DESCRIPTION	Elev. (feet)
										Plastic sheeting at soil surface.	
										Gravelly SAND with SILT (SM), brown, fine to coarse sand and gravel, subangular to subrounded, loose, moist (Fill).	
				0-1.5		2					
										1" thick dark organic layer (wood chips), becomes dark gray at ~3 ft bgs.	
				0-1.5		4				Dark organic-rich fine sand with silt and some gravel layer (~8" thick), very dark brown to brown at 4.5 ft bgs.	
										Dark organic-rich fine sand with silt and some gravel layer (~8" thick), very dark brown to brown at 4.5 ft bgs.	
				0-1.5		6				Becomes brown-yellow with some iron mottling at ~6 ft bgs (Weathered Native).	
								SM		Cobble encountered, becomes gray-brown at ~7 ft bgs.	
				0-1.5		8					
										Becomes brown-yellow, wet at ~10 ft bgs.	
				0-1.5		10					
										Becomes gray with subrounded gravel at ~12 ft bgs.	
				0-1.5		12				Cobbles encountered, becomes red-brown with decreased gravel content at ~13 ft bgs.	
				0-1.5		14				Boring completed at ~14 ft bgs. Groundwater encountered at ~10 ft bgs. 3/8" bentonite chips to ~5" bgs, concrete to surface.	

Station: _____
Surface Elevation: _____
Logged By: AAL

Drill Rig: Limited Access Direct Push
Equipment/Hammer: Acetate Liner/
Date Completed: 4-2-11



Universal Manufacturing
Supplemental Assessment
Woodinville, Washington

Boring Log B104
Project No: 22080.74417

Figure: 5
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NEIS_BORING_LOG_22080-74417-UNIVERSAL_MFG.GPJ_CDM_BLLV.GDT_4/20/11_REV.

Other Tests	Sample No.	Moisture Content (%)	Dry Density (pcf)	PI (ppm) [reading/background]	Penetration Resistance (blows / 6 in.)	Depth (feet)	Sample	USCS	Symbol	Boring Log B105 DESCRIPTION	Elev. (feet)
				0-1.5		2				Gravelly SAND with SILT (SM), brown, fine to medium sand and gravel, medium dense, moist. Lighter yellow-brown seam (1/2" thick) at 1 ft (Fill).	
				0-1.5		4					
				0-1.5		6		SM		Large subangular gravel encountered, increased moisture content at ~4.5 ft bgs. Cobble encountered, becomes gray-brown to brown-yellow at 5 ft bgs (Weathered Native).	
				0-1.5		8				Becomes wet at 8 ft bgs.	
				0-1.5		10				Boring terminated at 10 ft bgs. Groundwater encountered at 8 ft bgs. 3/8" bentonite chips to 4" bgs, concrete to surface..	
						12					
						14					

Station: _____	Drill Rig: Limited Access Direct Push
Surface Elevation: _____	Equipment/Hammer: Acetate Liner/
Logged By: AAL	Date Completed: 4-2-11


	Universal Manufacturing Supplemental Assessment Woodinville, Washington
	Boring Log B105 Project No: 22080.74417

Figure: 6
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NEIS_BORING_LOG_22080-74417-UNIVERSAL_MFG.GPJ_CDM_BLLV.GDT_4/20/11_REV.

Other Tests	Sample No.	Moisture Content (%)	Dry Density (pcf)	PID (ppm) [reading/background]	Penetration Resistance (blows / 6 in.)	Depth (feet)	Sample	USCS	Symbol	Boring Log B106 DESCRIPTION	Elev. (feet)
				0-1.5		2				Gravelly SAND with SILT (SM), brown, fine to medium sand, fine to coarse gravel, subangular, medium dense, moist (Fill). Seam of black, fine organics (peat) at ~0.5 ft bgs (2" thick).	
				0-1.5		4				Granitic cobble encountered, becomes brown-yellow to gray-brown, gravel becomes subangular to rounded at 1 ft bgs (Weathered Native).	
				0-1.5		6		SM		Cobble encountered at ~6 ft bgs. Increased moisture content, becomes gray at 6.25 ft bgs.	
				0-1.5		8					
						9				Becomes wet at ~9 ft bgs.	
						10					
						12				Boring terminated at ~11 ft bgs. Groundwater encountered at 9 ft bgs. 3/8" bentonite chips to 3" bgs, concrete to surface.	
						14					

Station: _____	Drill Rig: <u>Limited Access Direct Push</u>
Surface Elevation: _____	Equipment/Hammer: <u>Acetate Liner/</u>
Logged By: <u>AAL</u>	Date Completed: <u>4-2-11</u>


	Universal Manufacturing Supplemental Assessment Woodinville, Washington
	Boring Log B106 Project No: 22080.74417


Figure: 7
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NEIS_BORING_LOG_22080-74417-UNIVERSAL_MFG.GPJ_CDM_BLLV.GDT_4/20/11_REV.

Other Tests	Sample No.	Moisture Content (%)	Dry Density (pcf)	PI (ppm) [reading/background]	Penetration Resistance (blows / 6 in.)	Depth (feet)	Sample	USCS	Symbol	Boring Log B107 DESCRIPTION	Elev. (feet)
				0-1.5		2				Gravelly SAND with SILT (SM), brown, fine to medium sand and gravel, subrounded, medium dense, moist (Fill).	
				0-1.5		4				Dark organic-rich fine sand and silt with some gravel layer (~8" thick), very dark brown to brown, gravel becomes fine to coarse at ~1 ft bgs. Becomes gray-brown at ~1.5 ft bgs (Weathered Native).	
				0-1.5		6		SM		Granitic cobble encountered, becomes brown-yellow at ~5 ft bgs.	
				0-1.5		8					
				0-1.5		10				Boring terminated at 10 ft bgs. Groundwater encountered at ~9 ft bgs. 3/8" bentonite chips to 3" bgs, concrete to surface.	
						12					
						14					

Station: _____
Surface Elevation: _____
Logged By: AAL

Drill Rig: Limited Access Direct Push
Equipment/Hammer: Acetate Liner/
Date Completed: 4-2-11



Universal Manufacturing
Supplemental Assessment
Woodinville, Washington

Boring Log B107
Project No: 22080.74417

Figure: 8
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